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ORIGINAL ARTICLES.

HELMHOLTZ AND OPHTHALMOSCOPY.

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IT was to be expected and it is certainly eminently befitting that in this, the fiftieth anniversary of the discovery of ophthalmoscopy, much should be thought and said concerning the ophthalmoscope, its application to practical medicine, and its influence on the development and progress of ophthalmology. Of course, one cannot think of the ophthalmoscope without at the same time thinking of Helmholtz; but, on reading some of the contributions to the literature of the subject, one is led to wonder whether the association of the two is always based upon a clear understanding either of the genius of Helmholtz or his real position as the discoverer of ophthalmoscopy.

The mentality of Helmholtz was peculiar even among the peculiarities of genius, which perhaps is only expressing in another way the isolated quality of all genius. Yet it had a rigid law of its own to which it was immutably subservient.

It was my valued privilege in 1893, when Helmholtz made his only visit to this country at the command of his emperor, who wished to show to the World's Congresses at Chicago

the greatest product of his empire, to have a visit from this noble man. During a conversation, which finally drifted into personal reminiscences, his usual modesty and excessive impersonality were thrown off guard by his interest in the subjects under discussion, and he laid bare much of his methods of work and the motives that had impelled him to investigations in so many fields of scientific research. There was thus more fully explained, as must have been apparent to any close student of his life work, much of the seemingly unaccountable transition from one field of labor to another, which had marked his career as unique, and which had possibly laid him open to criticism in certain quarters. A military surgeon, a physiologist, a mathematician, and a physicist in its broadest and most comprehensive sense, as well as a profound philosopher, he covered a field broader than had been compassed by any one that had preceded him or is likely to come after.

As he himself explained it, the development of his various activities seemed as logical as the steps he followed in any one of his single investigations.

The bent of his mind was towards the solving of problems, the tracing of connections between cause and effect by the application of a known law, or the revealing of a law which was a necessity in the general scheme. When he had done this, when he had established a law, or defined the specific status of a law under certain fixed conditions to the satisfaction of his own mental conscience, he considered his task finished, and left to others the working out of the details in accordance with the law thus discovered, as well as their applications to practical life. He was the type of the scientific seer, a revealer of principles. All else he considered as subsidiary and accessory. It was fortunate for the world that this was one of the qualities of his genius, as it saved him from frittering away his energies on matters which ordinary minds could easily deal with. That another should make fame or fortune by the application of a law he had shown the significance of, was a matter of no consequence to him. The simple, almost child-like, indifference to such things was one of the sublimest traits in his exalted character. How easy it would have been for him, conforming to the modern commercial spirit, to have patented his discovery of ophthalmoscopy, for example, or

even to have gone on and really made an ophthalmoscope to be called by his name and written a practical treatise on its use (and how well he would have done it!). But he did none of these things; it was not in accord with the law of his being, and, fortunately, he left the principles of ophthalmoscopy in all its phases so thoroughly covered that there was no chance for any one else to patent it, showing how thorough and exhaustive his work had been. He left his discovery free to all the world, and thus gave opportunity to a large group of men to attach their names, for whatever of fame it might be worth, to instruments for numberless modifications (one of them only for a handle) of the original rough experimental apparatus which he had constructed in two days from pasteboard, cover-glasses and a lens, simply to verify a principle he had worked out by *a priori* reasoning from the well-known laws of optics.

And just here is the pith of the whole matter. Helmholtz never claimed that he invented an ophthalmoscope. He did not start out in his investigations with that specific end in view. What he did have as the objective point of his studies and to which he finally attained, was the *discovery of the principles of ophthalmoscopy*. This is not a subtle, finely drawn distinction. It is fundamental of the whole question. It marks the difference between the mechanic who devises things and the philosopher who discovers principles. Other men had made instruments which might, by a wide stretch of definition, be called ophthalmoscopes—such as Cummings and Babbage—and these or other means of illuminating the eye were known to Helmholtz, as he tells us. But were any of these apparatus, in so far as they represented a scientific instrument of precision, anything more than the crude material of which they were composed? What Helmholtz was seeking for was the principle, the law by the application of which the fundus of an eye under illumination could be inspected by another eye. When that was determined the construction of the apparatus to carry out the law was easy. This he did in his simple and rather bungling way (for he is known to have been a very poor mechanician) in two days, and the demonstration was a triumphant success. An exact counterpart to this feat of *a priori* reasoning is to be found in the well-known discovery of the planet Neptune by Adams and Leverier.

It might occur to any one who has studied the discovery of ophthalmoscopy at all attentively that the significance of this fact should not need to be insisted upon at this late day. But it appears from some recent writing on the subject that we are not without that necessity, since we find Helmholtz classed and considered as an instrument deviser with Babbage, Ruete, Rekoss, Jäger, Loring, Liebreich and numberless others whose names are familiar to us on the pages of the catalogues of instrument makers. Even Dr. G. M. Gould, usually so accurate in matters of this kind, fails, in his article on the ophthalmoscope in the second volume of Norris and Oliver's System, to insist on this essential point in the evolution of ophthalmoscopy.

It is much more apparent, however, in an interesting and otherwise well-prepared paper, by Dr. Sam'l Theobald of Baltimore, on "The Evolution of the Ophthalmoscope and What It Has Done for Medicine," published in the *New York Medical Journal* for June 22, 1901. He says, in the second paragraph of his article:

"As has often happened with important discoveries and inventions, Helmholtz's contrivance of an *augenspiegel* with which to inspect the interior of the eye, first described in a monograph published in Berlin in December, 1851, seems to have been but the logical outcome of a series of interesting observations made by a number of investigators in the field of physiological optics. *But, oddly enough, the problem which these investigators, with the exception of Cummings, were endeavoring to solve, and which Helmholtz himself had in mind, was not the discovery of a means by which the background of the eye could be inspected and the pathological changes situated there recognized, but the solution of the question, why, under usual conditions, the pupil of the eye appears black, and seems to omit no light, while under certain unusual conditions it does emit light and assumes a reddish appearance.*" (Italics are mine.)

It would be difficult to find a more pronounced instance of complete misconception than is manifest in the foregoing paragraph, in so far as it refers to Helmholtz. Helmholtz knew as well as, or perhaps better, than any one who had gone before him that the illumination of the pupil was due to

the reflection of light from the bottom of the eye. This was, however, only the beginning of the problem, the point where all the others had stopped, but at which he did not propose to rest. The problem as it presented itself to his mind was somewhat as follows: If light comes from an illuminated body, why cannot that body be seen? What are the obstacles in the way, and are they insurmountable? What are the particular obstacles in the case of the eye? The eye is an optical instrument with a refracting power of its own and must exercise an influence upon all rays passing out of it as well as into it; therefore: "the observed, eye having been rendered luminous, there is only a second consideration to be fulfilled, namely, to make it possible for the eye of the observer to accommodate itself to the focal distance of the one observed."* This is the eternal law of ophthalmoscopy, as succinctly stated as the law of gravitation by Newton. And that was Helmholtz's immortal discovery. It only remained to demonstrate its truth. This he did with the rough appliance made from materials at his hands in the laboratory: but it was sufficient to establish the existence of the principle and to reveal that which had been hidden in impenetrable darkness during all the preceding eons of time—the background of the living human eye.

Nothing could be farther from our thought than to insinuate that any of these writers desires to detract in any degree from the glory of Helmholtz's achievement. They, as well as all other men of science, know that the fame of Helmholtz is safe for all time; and we are all glad to be permitted in the mid-century celebration of his discovery to do him honor each in our degree. But we owe it to ourselves that we honor him for the right cause and in a just and discriminating spirit. We want the celebrants of the hundredth anniversary of the discovery of ophthalmoscopy to know that we of the same generation as the master appreciated his transcendant genius at its true value. The fear that they might not be so impressed is, it seems to me, borne out by this additional ex-

*From an address delivered in New York "On the History of the Discovery of the Ophthalmoscope," and published in the *New York Medical Record*, December 16, 1893. This was probably his last utterance on the subject, as he died soon after his return home.

tract from Dr. Theobold's paper: "And now, having reached its consideration in chronological order, let us turn our attention to the ophthalmoscope of Helmholtz. What shall we say of it? That it was the legitimate parent of all later ophthalmoscopes; that it was the first instrument with which the background of the living eye was seen *distinctly;* that Helmholtz was absolutely the first to suggest the direct method of ophthalmoscopy; and that it was he who directed the world's attention to the subject, are facts which are not open to dispute. But, having willingly accorded him this large measure of credit, I believe I do his memory no injustice in asserting *that what was essential in his ophthalmoscope was not wholly original, and that what was original was not only not distinctly essential, but was the outcome of a misconception—a fortunate misconception, as it turned out—on his part.*" (Italics are his.)

As regards the "misconception" on Helmholtz's part in employing a concave lens behind the glass plate, we may judge of how far it is in keeping with his induced law, that it must be made possible "for the eye of the observer to accommodate itself to the focal distance of the one to be observed," when we quote the next sentence of the paragraph (l. c.): "This was easily done, it being only necessary to choose a lens of proper focal distance." The word *proper* indicating that for eyes of different focal powers different lenses would be required, thus laying the foundation of ophthalmoscopic optometry, as Dr. Theobold himself states elsewhere.

As to what was original with Helmholtz in the discovery of ophthalmoscopy, we have endeavored to set forth with whatever of clearness and impartiality we could command. But Helmholtz has himself had something to say on the subject, and it would be well that we listen to him. In the same address (l. c.) he says:

"All that was original with me in the matter was that I went on to ask how optic images could be produced by the light coming back from the illuminated eye. All my predecessors had failed to put that question to themselves. They had stopped in the middle of their way instead of going on to the end. As soon as I had answered that question I saw also how an ophthalmoscope could be constructed, and it took me

only two days to do it and successfully experiment with the instrument. I say this to impress upon you how necessary and useful it is to go on to the end when investigating natural phenomena. You must not go half-way and then stand still or go back; you must finish your meditations, go to the end so that you may see clearly the full relation of the several phenomena to one another. Having followed the chain up link by link to the end; having traced the rays of light on their course from the flame into the eye of the observed, and shown what becomes of them when reflected, and how they can, by the interposition of proper lenses, be united on the retina of the observer, and thus give him a distinct view of the background of the eye observed; that was the solution of the problem; and with that, gentlemen, my story is told." And, we cannot help adding, with what sublime simplicity!

It cannot be claimed by even the most enthusiastic admirers of the genius of Helmholtz that all his work is of equal value or is impeccable. To argue so would be to contend that he was superhuman. No one was more aware of the incompleteness of some of his labors than he was himself, for no one knew better the limitations of our knowledge which bar the way towards ultimate truth. The theory of color-perception which he took over and modified from Young, has not been found to stand the test to the satisfaction of many. He himself admitted to me, who have not been able to accept it in full, that there were weak places in it, which, however, he had not found at that time were any more clearly met by other theories. His theory of accommodation has been seriously questioned as to some of its details (though not as to essential principles) by Tscherning, and we hear recently that his explanation of tone perception will probably have to be modified so far as the part played by the organ of Corti is concerned. But all this is beside the matter. The full measure of his greatness is not to be judged by this or that particular achievement. It rests upon his high personal character, his outlook on scientific questions and the methods he employed in their solution. The value of his life to succeeding generations, like that of all inspired men of the type of Bacon, Darwin, Spencer and Kelvin, is to be estimated by the informing spirit and the impulse that urged

them onward in whatever work their hands found waiting to be done. That lesson of their living was never more needed than it is to-day. Helmholtz has aptly expressed it by "not stopping half way." Alas! so many of us loiter in that "*selva oscura, nel mezzo del cammin,*" not daring or caring to push onward, at any cost, to the light, only to be found at the other end.

LACRYMAL OBSTRUCTION AND ITS TREATMENT.*

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ON account of the advanced ideas of the therapy of this condition and contending opinions regarding the early recovery of these cases, this subject becomes of more than passing interest to the ophthalmologist and likewise the general surgeon.

It is our intent to dwell upon those cases amenable to therapy and lesser surgical measures. As all know, certain cases, in spite of our efforts, persist in opposing every form of treatment other than the complete extirpation of the lacrymal sac and gland. The contribution of Dr. Holmes on this subject is probably the best at our disposal and needs no addition.

The embryonic formation of the lacrymal canaliculi begins about the sixth week. It is not always complete. In consequence we may find the groove partially united, many times, two or more openings presenting. These anomalous conditions are very rare and of no consequence.

The lining of the canaliculi is a continuation of that from the nose and conjunctiva, and is of a vascular nature. In consequence very susceptible to chemic and thermic changes. The mucous membrane is seen in folds and acts in conjunction with the little valve at the nasal opening as adjunct valves to prevent the regurgitation of tears, and the expulsion of air in blowing the nose—a disagreeable sensation often complained of in patency of the duct. It is to be noted that there is a constant suction downward in the duct, due to the pecu-

*Read at the meeting of the Western Ophthalmologic and Oto-Laryngologic Association, held in Cincinnati, Ohio, April 11-12, 1901.

liar anatomical construction and nasal breathing. This is demonstrated by the complete drainage that is often seen in malformation of the puncta and want of perfect opposition of the lids to the eye-ball, and furthermore by the presence of foreign bodies in the puncta, such as cilia especially.

The function of the duct is to carry into the nose the secretions from the lacrymal gland, conjunctiva and other glands, so beautifully described by Dr. Alt in his original contribution on "Glandular Structures of the Eye and Its Appendages," thereby freeing the cornea and conjunctiva from extraneous matter.

By extraneous matter we refer to dust, infectious material constantly floating in the air, and micro-organisms which may accumulate and are washed into the sac, thence into the nose. Many of the latter are of no consequence, while others, such as the staphylococcus pyogenes albus and aureus, and staphylococcus epidermis albus of Welsh, are frequently found; and if any slight obstruction of the ducts allow them to accumulate in the sac, if not the cause of active inflammation they may at least keep up an irritation.

When the drainage is normal the inhibition of germ life in the sac and conjunctiva is presumed to be complete. Where the natural function of the duct is interfered with patients may have simple epiphora, dacryocystitis, lacrymal abscess, or necrosis of the bones forming the canal. Many cases of acute and chronic inflammatory conditions of the lids and cornea may, if not directly caused by the stenosis of the duct, be so retarded in process of recovery that direct attention is demanded before relief of the primary symptoms is secured. The operation of opening the canaliculi of the duct in no wise interferes with the function of the duct, so we should make free to open when indicated. Epiphora, being a symptom, should not be confounded with obstruction of the duct. When this symptom presents itself its cause should be carefully investigated. Epiphora following closure of the duct should be differentiated from that accompanying coryza, hysteria, preceding tabes dorsalis, hyperesthesia of the retina, anomalies of refraction, thermic and chemic change.

Cause.—The cause of the alteration in the natural lumen of the duct or inflammatory changes, other than those men-

tioned, are many: during the passage of the child through the vagina or in manipulation, or fall in infancy, pressure is so made as to affect the canal. Haab speaks of hereditary predisposition as a cause. Then we have the classical extension of an inflammatory condition from the conjunctiva or Schneiderian membrane, the vascular supply being so great about the little nasal valve that the latter is more often a cause than any other. Especially is this the case in children poorly nourished or of a strumous diathesis.

It is very easy, for exfoliation of cells within the duct and mineral deposits from the tears, to become enveloped in the little folds of the mucous membrane, and eventually lead to stricture and narrowing of the duct.

Diphtheria by extension through the tear duct, and exanthematous diseases which especially involve the mucous membrane of the eye and nose, fracture of the lacrymal bone, and deflection of the septum, may also lead to obstruction.

In those subjected to the dust of cities, and in travel, the irritating effect of gases, especially natural gas, or any irritation that may cause a prolonged hyperæmia of the conjunctiva, are more susceptible to disease of the duct.

The alteration in the peculiar anatomical position of the puncta, especially seen in the old, due to old catarrhal trouble and natural loss of elasticity, may be classed advisedly as a cause. Under such conditions the puncta takes on a variety of forms, standing in cone shape, turning in or out, and may be widely expanded with partial prolapse, as it were, of the immediate canal, or so contracted and obscure that only an intimate knowledge of anatomy of the lids will enable us to find the natural opening.

Symptom.—In many cases the only symptom complained of for years will be the epiphora constant or upon exposure to cold winds, in others purulent inflammation with abscess will soon follow; again only a mucocele, emptied at will of the patient by simple pressure. These conditions continue with more or less severity and variation until patient is compelled to consult an oculist for relief.

Treatment.—In the infant and new born, treatment promises a more speedy relief than in the old. The sooner we resort to operative measures in the young, as well as the old, the better for the patient.

The present article deals especially with sub-acute and chronic cases in which we are able to pass a probe through the duct.

The following illustrate the character of the cases usually seen in the infant:

Case I.—Babe, five days old, distinct mucocele of the left lacrymal sac; upon pressure contents of tumor readily expelled. The infant was, on the seventh day, anæsthetized, duct opened, and No. 5 probe passed. On the following day No. 2 probe passed and duct irrigated. The irrigation was continued for a few weeks, when complete recovery resulted. What was the probable cause in one so young? Evidently a congenital closure of the lower end of the duct.

Gunn (*Ophthalmic Review*, Feb., 1900) remarks that "the secretion, if it exists in fetal life, is very slight." In addition, I might add that as soon as the child makes its exit into the world the function of the glands of the eye, like those of the entire body, are stimulated into action, and that of the conjunctiva is usually a vigorous one. In a few days the sac and duct is filled to overflowing, if there is any nasal obstruction, and with the enforced distention the mucocele readily develops.

Case II.—Child, four years of age, of a strumous diathesis, an offensive catarrhal condition of the nose, with an eczematous condition about the meatus of the nose so conspicuous at times in these cases. There had occurred, some time before consulting me, an abscess of the duct and rupture, with the formation of a fistula. Fluids injected into the duct would pass through this opening. Under an anæsthetic the duct was opened and No. 5 divided probe passed and left in position for two days, with cold applications and bandages to prevent injury. After this the duct was irrigated daily, care being taken to see that the fluid, protargol, 5 per cent. solution, passed into the bony channel. A small No. 2 probe was occasionally passed. After three months child made a perfect recovery.

Case III.—Woman, aged thirty, complained of simple epiphora, prolific at times, for years. The duct was slit and a No. 4 divided probe passed with great difficulty and considerable force. The entire duct was occluded. The probe fit as solidly into the duct as a nail in a board. Cold applica-

tions were recommended and probe allowed to remain in position for four days. It soon began to loosen, absorption being stimulated about the probe, and on the fourth day the probe was readily reinserted after irrigation. This was removed every other day for a week following, when it was removed permanently. The irrigation was continued with collyrium of the protargol. In that case there had been a gradual erosion of the mucous membrane from fungi in the duct or extension of the disease, causing stricture and ultimate obliteration of the canal.

I am sure that in the treatment of such cases as the above the radical good resulted from the continued distention of the canal, by allowing the probe to remain in position, and subsequent irrigation with the protargol.

Case IV.—Mrs. S., aged thirty-five, strong and well nourished; diagnosis chronic dacryocystitis; duct opened and No. 6 probe passed and allowed to remain in position for three days. Removed probe, irrigated with protargol, and probe reinserted; on second day following probe removed and small lead style inserted. The style was worn for two weeks; canal irrigated daily with protargol. Patient then returned to the northern part of the State, free from further trouble.

These cases enumerated I think typical of those that present themselves amenable to simple treatment. It is very important for us to remember that the narrowest part of the canal is at the emptying of the sac into the duct, and that the knife must pass into the duct, completely dividing the stricture and even normal fibrous bands.

In the recital of the above cases I have dwelt on the use of the divided probe, which, as you see, when passed into the duct the protruding portion is readily detached. It is better, I believe, to leave the original probe in position than to remove it at once and try to insert styles, etc., subjecting the patient to additional torture. By leaving the probe in position for a few days disintegration of the bands of connective tissue and deposits are stimulated, and a permanent patency of the duct is more easily established.

The size of probes indicated in the treatment of these cases is still a debatable question, there being no positive rule in regard to size. It has been my observation that we should begin with the large probe in old cases—No. 6, if

possible—allowing it to remain in position as indicated above, freeing the duct afterwards with small probes, that is, those which pass with ease into the duct to restore the normal caliber in the duct.

The condition of the nose in all these cases must have our very careful consideration. Often surgical attention of the lower turbinate or septum is indicated.

My observation is that the careful attention to the therapy of the nose does not play the important part in the cure of stenosis of the duct that is claimed by some writers.

Where there is patency of the duct in acute cases great care should be taken in the passage of sounds for fear of unduly wounding the mucous membrane, relying more especially upon the irrigation to restore the normal calibre of the duct.

The attention of the profession in this country was in 1898 first called to the silver salt, protargol, introduced by Neisser. Since that time I have used this drug in varied solution as irrigation and collyrium, with uniform good results in treatment of cases of this character.

One word further relative to the efficiency of protargol.

Some eight months ago a patient with senile cataract and chronic dacryocystitis of left eye (the right having been previously operated on) consulted me. On pressure a great amount of yellow fluid was exuded from the puncta, at times glueing the lids together at night. The duct was opened and small probe passed. The following day I left the city and instructed the passage of probe and irrigation to assistant. In a week I returned and found the duct totally occluded, nor could I pass the sound, the assistant having failed the second day. The sac could be easily irrigated. The patient informed me that he could not remain longer in the city and demanded that I operate at once. I explained the danger of infection, but he promised to take the chance. The sac was irrigated with 10 per cent. protargol and the eye flushed with hot 5 per cent. protargol and lens removed. There followed no subsequent inflammation, and patient made a perfect recovery. The cystitis continued to trouble the old gentleman until his death, a few weeks ago.

Others have previously indicated the value of solution of protargol preliminary to cataract extraction.

DISCUSSION.

Dr. A. Alt, St. Louis.—There are a few points in which I cannot agree with the essayist. First to the main point. Dr. Kyle says that slitting the canaliculus does little or not interfere with drainage. My experience is to the contrary, and although I never in former years slit the lower canaliculus, but always the upper one (whenever this was possible), I have seen cases again and again in which no sucking up of the tears took place, although I could easily pass a large Bowman probe. From these considerations I have for about 10 years returned to the method inaugurated by Otto Becker, while I was a student at Heidelberg, namely, that of dilating the punctum with a conical dilator and then introducing a probe. I find that such a non-forcible dilatation of the punctum will admit a No. 5 and sometimes a No. 6 Bowman. As far as we can expect good results from this treatment alone, I am surely much more pleased than I was formerly when slitting the canaliculus. Of course in all of these cases the conditions of the nose should be carefully examined into, and any abnormalities be treated. As regards the injection of fluids into the tear sac, I also wish to take a different stand from the essayist. At least I would advise great caution in this direction. It certainly has occurred to others, and a number of times it has occurred to me, that the wall of the tear sac gave way under even a slight pressure, and the fluid was forced into the surrounding tissues, causing severe reaction and even abscess formation. I have in consequence given up routine syringing and apply this treatment with hesitancy only. The Theobald probes I have seen used, but never used them myself. With regard to the removal of the lacrymal sac and gland, I would prefer to be conservative. Patient, though long continued, treatment will often lead to a cure and to proper function, without having recourse to such a heroic measure. The cases in which the latter is absolutely necessary are, in comparison, but few.

Dr. Derrick T. Vail, Cincinnati.—There are one or two points which I would like to mention in connection with this very live and interesting subject. One of these is in reference to a certain quiet form of dacryocystitis which we do not recognize or do not even suspect until it is too late. I

refer to the caseous deposit of decayed septic matter which sometimes exists in the lacrymal sac in certain aged people who are about to be submitted to an operation for cataract or iridectomy. There are no symptoms of dacryocystitis whatever. If you press on the sac the result will be negative. Should you ask them if their eyes water or if they ever had any tear-duct trouble of any kind, you will usually get a negative or unsatisfactory answer. The chronic conjunctivitis always present in these cases may entirely escape your notice, for so many aged people have those thickenings and calcareous deposits in the conjunctiva that it is easily overlooked. The only way in which caseous dacryocystitis is to be recognized is by dilating the lower canaliculus with a Galezowsky dilator and using Anel's syringe with warm salt solution, driving the piston down gently and thus allowing the solution to wash out the sac. If necrosed tissue and old spores are present in the sac, masses will be regurgitated into the conjunctival sac through the upper canaliculus.

Less than a year ago an aged lady came into my office to consult me about her left eye. She had a simple senile ripe cataract. She had had her right eye operated upon for cataract three years previously by a very able oculist of this city, but the eye was lost through panophthalmitis, and she was very loth to have her left eye operated upon, as she feared the same disaster might result. She presented neither the history nor the symptoms of dacryocystitis, but I used the Anel syringe in the manner described and found quite a quantity of thick cheesy substance in the sac. Had this condition been unrecognized and an extraction performed, the result would surely have been fatal to this her only remaining eye. Being unwilling to pass through the radical operation of extirpation of the lacrymal drainage apparatus, I simply sealed the puncta with the galvano-cautery. A short time afterward I extracted the cataract and had an ideal result. She has her sight to-day.

Another point which I would like to mention is in regard to the differential diagnosis between real purulent dacryocystitis and those circumscribed inflammations simulating it. I have seen two cases during the last year which looked exactly like acute purulent dacryocystitis, but were in reality

pseudo-dacryocystitis. The symptoms all seemed to be those of genuine abscess of the tear sac—the swelling, throbbing pain, fluctuating tumor and epiphora were all present, and yet in neither of these cases was there the slightest affection of the tear-sac proper. The trouble arose from the nose. Both of these patients had necrosing ethmoiditis, and some of the infectious material from the anterior ethmoidal cells had dissected outwards under the periosteum of the lacrymal bone, stripped up the membrane and formed a sub-saccular abscess. If this has occurred twice in my experience in a year's time it certainly is more common than one would think, and it behooves us to be on the lookout for these cases. In both of these I syringed the tear-sac through the canaliculus and the water passed down through the nose and came out *perfectly clear*. If there had been an abscess in the tear-sac it is evident that the water would either not have passed through at all, or, if so, would carry along with it the contents of the inflamed sac. In one case I curetted the ethmoid cells through the nose, and it was found that the inflammatory process there was gummatous in character. In the other case I made an outward incision, being very careful not to wound the tear-sac. Both the cases went on to perfect recovery.

Dr. J. O. Stillson, Indianapolis.—I think that there is one point on which we all will agree, and that is that these cases are the *bêtes noires* of the ophthalmologist. If there is anything that does try the patience of Job it certainly is a case of dacryocystitis which has run on until there is a stenosis of the duct. The continuing of these cases in our practice for years sometimes is enough to worry the life out of a man. The size of the probe I do not think cuts so much figure in curing the disease as the manner in which it is inserted. In regard to the slitting up of the lacrymal duct, it seems to me that common sense (with all due respect to Dr. Kyle and the gentlemen who agree with him) would suggest the unreasonableness of this procedure. The proposal to slit up a tube and then expect it to retain its suction power seems to me hardly tenable. I think if we will remember one little thing about these cancliculi it will enable us to grasp the idea with a little more reason and common sense. We all know a syphon will suck uphill and then downhill. We know the canaliculi are

like syphons, especially the upper, the lower one being more of a drainage tube pure and simple. Some years ago I abandoned slitting the lower canaliculis because I found when I did it the eye would weep in spite of everything. I found in the cases where I did succeed in slitting the upper canaliculus I would get drainage and not deprive it of its power of drawing tears out into the sac. If you use the upper you will get a better result than if you use the lower canaliculus. Like Dr. Alt, I have found by dilatation I could get in a probe pretty well where I was in the habit of slitting. I have also found in cases where ladies especially would not submit to the knife, I have been able to pass a filiform bougie (and passed it readily), and thus would get the canal open. In passing the probe through the upper canaliculus, having first employed dilatation by gradually increasing the size of the probe, you can accomplish everything that can be obtained by the slitting up of the lower canaliculus. The chief trouble in slitting the canaliculi is to get them to remain open. I have had a number of these cases where the opening would get smaller and smaller until I would have to insert a filiform bougie. Unfortunately my operations for the total extirpation of the sac have not been followed by the results recorded by the essayist. Where I have taken out the sac I have had to take out the gland also. I think the operation recommended by Dr. Holmes a good one, but I would not recommend it in all cases. I would employ it where there was a complete stenosis and the tears forming continuously.

Dr. Christian R. Holmes, Cincinnati.—I have never been wedded to the use of very large probes. One reason is that the lacrymal canal is lined with erectile tissue of the same type as we find upon the inferior turbinated bodies. Years ago it was a common thing to see patients sitting in the office of specialists with large rubber bougies in their nares. The idea was that the pressure on the inflamed erectile tissue would cause restoration to its normal condition. We know now that this is not practical. And as virtually the same structure is present in the tear ducts as in the nasal canal, I have never adopted the forcible distension or laceration of these parts. We know that if we lacerate the parts in any way we have sooner or later cicatricial contractions following this pro-

cedure. I am content nowadays to use a moderate sized probe, and I do not slit the canal as often as formerly. There is one thing we must not forget, and that is not to commence to treat the tear duct from the wrong end. The eye is not the seat of infection except in a very small percentage of cases; the infection comes from the nose. This has been demonstrated beyond a doubt, and we must therefore not forget that the nasal end must be attended to first. A great many cases of eye trouble have been relieved by removal of hypertrophied tissue from the turbinated bodies, of polypi, opening of accessory cavities or reduction of localized inflammation. When I speak of removal of hypertrophies from the turbinated bodies I mean only to restore them as nearly as possible to the normal condition, only to remove the diseased tissue to permit free ventilation of the nares and reduce inflammation, which so often involves the outlet of the tear duct. The opening of this canal is so small that at times you can scarcely find it. In some cases it opens high up under the inferior turbinated, while in others the duct passes obliquely through the mucous membrane, emerging as much as 10 mm. farther down. It is through this end of the tube that the trouble begins in 90 per cent. of our cases.

We know that cataract cases have been lost again and again by the lack of attention to the tear sac. I will cite a case which illustrates this point in a forcible manner. One of our most able men in the West removed a cataract from the eye of a woman eighty years old. Panophthalmitis and enucleation followed. The cause of this trouble was failure to recognize an old latent affection of the tear sac. She came to me four years afterwards and desired an operation for cataract upon the other eye. By pressure there was no evidence of any trouble in the tear sac, but careful syringing brought away a small amount of cheesy material composed largely of pus-forming bacteria, a condition in which slitting, probing and washing could not absolutely guarantee against infection of the corneal wound, even if she had been willing or able to undergo the sufferings attendant upon such proceedings, which she was not. I therefore removed the tear-sac and seven weeks after extracted the cataract with perfect result. Therefore in all our cataract cases we should examine the

tear-sac to ascertain if there be any infection. I practice the radical operation, *i. e.*, complete extirpation of the lacrymal sac and glands, and have written something on this subject, reporting seventen cases up to March, 1898; the result was perfect in all of them, and I have had a number of cases since then which I have not reported, but which have had equally good results. The cases reported were operated upon at various times during the ten years preceding the re-examination in 1898. Some of them had a single and some a double operation, and every one of them was in perfect condition. To obtain such results we must remove every portion of the lacrymal glands. It is difficult to secure all of the scattered accessory glands, but unless you do you will be surprised to see what an activity the remaining gland tissue will take on afterwards, and more or less epiphora will continue. You need not be afraid to extirpate every vestige of both the large and small glands for fear that the eye will not be properly lubricated. The minute glands of Krause, which, to the number of thirty or forty, are located in the upper lid, and a few in the lower, aid largely in supplying all the necessary secretion. Should any one of you desire detailed information on this subject, I beg to refer you to my article in the *Archives of Opthalmology*, Vol. XXVIII., No. 1, 1899.

Dr. Vail spoke of peri-saccular abscess. I have a case which I hope to show before the other section to-morrow. He came during my absence, suffering from dacryocystitis, the phlegmonous swelling over the seat of the sac rupturing a few hours after his admission to the hospital. The nares on the same side were inflamed, discharging muco-pus, and containing a number of polypi and hypertrophied tissue on the turbinated bodies.

My first assistant, Dr. Chas. H. Castle, removed the polypi and hypertrophies, and opened the anterior ethmoidal cells. Syringing and treatment of the sac failed to stop the discharge, and he then extirpated the sac and gland. The wound over the seat of the sac healed promptly, but after several weeks inflammation appeared again where the sac had been. I found the patient in this condition upon my return to the city. The inflammation involved all the accessory cavities on the right side of the head. I opened the right frontal

sinus through a free external opening, and found the cavity very large and filled with pus and polypoid tissue. I also found the ethmoidal cells diseased, and removed their walls. On account of the duration of the operation and profuse bleeding, I determined to finish the operation at another time. Accordingly after two weeks I opened the antrum through the canine fossa, and found it filled with polypi and pus, with necrosis of the bone in the region of the tear-sac. I removed all diseased parts, including a part of the nasal wall, to give permanent ventilation and drainage to the cavity when the opening in the canine fossa should be permitted to close. The sphenoid cavity was also opened and contained pus, but not any polypoid tissue.

The point I desire to make is that the first symptoms to which this patient paid any attention were those of dacryocystitis and its complications, which after all were only secondary, and due to extension from the accessory cavities. All secretion has ceased months ago. It only remains to close what is now a small opening over the frontal sinus. This case certainly demonstrates that there are cases of dacryocystitis whose origin of infection is from the accessory cavities. Strange to relate, the patient before mentioned had never suffered from headaches or any pain or inconvenience, excepting from free discharge from that side of his nose, until the tear-sac became involved, fifteen years ago, which, however, had never given him enough concern to cause him to seek relief. All of the cavities have healed. I should not feel safe in relying upon sealing of the tear-duct if the sac was infected, because of its liability to become *unsealed* at any time, and if the sac is not infected there can be no reason for the operation.

Dr. W. L. Dayton, Lincoln, Neb.—I feel a good deal like Dr. Alt does in regard to this matter, and I cannot agree with Dr. Kyle in his assertion that slitting up of the canaliculi does not interfere with the proper drainage of the eye. I believe that it does, and for that reason for the past few years I have been probing the duct through the punctum when I could dilate it so that I could get a No. 5 probe in, and in a very large patulous punctum a No. 6. I find where there is just a slight stenosis that this often suffices. Where there is

a fibrous contraction or stenosis of the duct, and the sac is free from acute trouble, then I think it is necessary to slit up the canaliculus and use, not a No. 5, 6 or 8 probe, but a No. 10 or 12 Theobold size, and even up to No. 14. I can recall the case of a child, five years old, whom I had under treatment for some time, who had a complete stenosis. An abscess which had formed ruptured externally and there followed cicatricial stenosis. I kept the duct open with small probes for some time—several weeks—and for five or six weeks there was no improvement. I then used a No. 12 Theobold probe on this child (remember, only five years old), and in four applications of the probe the child was so much improved that it returned home. That required probably ten or twelve days. I did not repeat this operation day after day. After returning home the child remained well. Now that No. 12 probe entered the duct very nicely without much more pressure than I used to pass the No. 5, and the sac was not injured in its passage. Now in regard to the tearing of the sac so that fluids would enter the tissues. Undoubtedly tearing is frequently done in forcing a large-sized probe through the punctum even when no false passage is made, and when in such cases we afterwards force fluids in through a small lacrymal syringe, œdema and possibly an abscess results on account of the fluid escaping into the surrounding tissues. For this reason it is my practice for the first few times, after having probed and found much resistance, to use gently a very mild solution of bichloride or any other agent. As to extirpating the sac entire, I am certainly not in favor of it so long as we can establish a patency of the duct by means of large probes. It certainly requires, if this radical operation is performed, an extirpation of the lacrymal gland also, otherwise we have the epiphora continuing. The use of the large probe I have carefully investigated (of course I have not had a large clinical practice), and in my own practice I have never had reason to turn them aside for the smaller probes. For that reason I would encourage the use of the larger probes to the exclusion of the radical operation for the removal of the lacrymal sac.

Dr. C. Barck, St. Louis.—I do not believe that I can add anything new to what has already been said. The rules which guide me in these cases are absolutely conservative. In the

first place I believe that recent cases, those which have existed only a number of days or weeks, can be cured without slitting the canaliculus, and whenever we can get along without doing so this is certainly preferable. I agree with Dr. Alt and Dr. Stillson, that it is a great mistake to slit the lower canaliculus, and I have never done it. I have always emphasized the point that the lower canaliculus is the most important for the suction of the tears, and, if slit, it will not perform its function as well as in the normal state. As to probing and injections, I think that the force admissible is largely a matter of experience. We know that too forcible probing is not to be done. I believe that injections are possibly more dangerous than the use of the probe, simply because when you use the injection and rupture takes place you cannot tell how much of the fluid escapes into the adjacent tissues, and cannot control the exact amount. I have discarded the use of the very large probes; I hardly ever go beyond a No. 10 and as a rule not higher than a No. 8 or No. 9. As far as the radical operation is concerned, I believe it ought to be limited to such cases where there is an impermeable stricture or osseous closure. In a number of very obstinate cases, where treatment extended over one year, and where I had at first thought of extirpation of the sac, the result was a complete recovery, observed for years. The cases in which I have extirpated the lacrymal sac and gland have been those which were brought about by injury or disease of the bone, resulting from syphilis, etc.

Dr. M. F. Coomes, Louisville.—I would like to add a few remarks to what has already been said. In regard to rupture of the sac, I have seen it occur time and time again. Fortunately in my cases I have not had an abscess result from the escape of fluid into the tissues, possibly because in the early stages I used antiseptic solutions. In regard to slitting up the canaliculi, I think Dr. Kyle will find out in years of experience that the less often he does this the better off his patients will be. There is no question but that the function of these parts is impaired by such a procedure, but at the same time in some cases we are forced to do it, I have found in treating chronic abscesses of the sac there is nothing like good free drainage, and in treating these strictures to adopt

the means for the fullest distension in the beginning, passing in the large probe and keeping the canal open if possible. In regard to the extirpation of the sac, I am not ready yet to accept the doctor's radical treatment. In all my experience of twenty-five years I have never had occasion to extirpate the sac. I further think when you extirpate the sac the lacrymal gland will have to come out. If you do not do this you will certainly have a constant epiphora. Unless you remove the gland you have simply gotten rid of one part of the trouble. I think Dr. Holmes after a few experiences will not feel like extirpating so many sacs as he does now.

Dr. J. J. Kyle, Indianapolis.—I do not believe I have very much of anything to add to what has already been said. I have enjoyed the discussion very much, and feel that I shall be a little more conservative in slitting the duct after this. I think the conservative passage of the probe (a No. 2 or No. 3) into the duct will possibly do no harm and its use will sometimes clear up the diagnosis.

PAMPHLETS RECEIVED.

"What Routine Shall We Adopt in Examining the Eye Muscles?" by A. Duane, M.D.

The Results of Surgical Treatment of Inflammation of the Mastoid Process," by E. B. Dench, M.D.

"Notes on the Bacteriology of the Conjunctival Sac and Its Bearing Upon Surgical Procedure," by P. Ch. Jameson, M.D.

"The Importance of the Early Recognition of an Inflammation of the Middle Ear by the General Practitioner," by E. B. Dench, M.D.

"The Treatment of Chronic Otorrhœa. Two Cases of Intra-Cranial Infection Following Middle-Ear Suppuration," by E. B. Dench, M.D.

"Report of Three Cases of Ligation of the Internal Jugular for Septic Thrombosis Following Purulent Otitis Media; Recovery," by E. B. Dench, M.D.

MEDICAL SOCIETIES.

PROCEEDINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.*

Thursday, June 13th, 1901.

G. Anderson Critchett, M.A., F.R.C.S.E., President, in the Chair.

Study of Inflammatory Exudates into the Vitreous.

Dr. Leslie Buchanan read a paper on this subject, which was illustrated by lantern slides made from his preparations. He said that the exudation into the vitreous in cyclitis was, in the first instance, formed in the pars ciliaris retinæ, and more especially in the non-folded portion of it, but soon the folded portion, the fibrous stroma of the ciliary body, and the retina took part in the production of the inflammatory exudate. The exudate into the vitreous body was seen in the fresh specimen fixed in 5 per cent. formalin as opaque white flocculent masses. It might be divided into zones, which from the ciliary body inwards were as follows, namely: (1) a fibrous zone; (2) a fibrinous zone; (3) a fibrino-cellular zone. The formation of fibrous tissue began very early, probably about the eighth day. The formation of fibrous tissue was accomplished by the action of certain oval nuclei on the fibrin, ending in the formation of fibrous tissue. The cells which formed the exudate at first formed masses on the non-pigmented layers of the pars ciliaris retinæ and were of various characters. That these cells were not all derived from the endothelium was shown by bleaching and restaining, when many cells might be seen migrating through the pigment layer to the free surface. In the retina also there was evidence of migration. The cells thus exuded passed to a greater or less depth into the vitreous. Here they proliferated rapidly. In the more superficial portions of the exudate degenerated protoplasm might be seen not having a nucleus, though no instance of mitosis had been seen. Fatty degenera-

*British Medical Journal.

tion followed, and further migration of nuclei took place, these finding their way back by the lymphatics. A fibrinous cyclitic membrane was thus left infiltrated with fat, and highly vascular. The fat was absorbed, the blood vessels were gradually constricted, leaving a comparatively avascular fibrous tissue layer, by the contraction of which the eye was distorted and destroyed. A further change was the formation of true bone. Spherical globules were formed, which grew, forming a solid mass penetrated by blood vessels, and finally converted into bone. The bone corpuscles were probably fibrous tissue corpuscles. The cavities of the bone were lined by osteoblasts containing blood vessels, fat, and crystals of fatty acids.

Paralysis of the Third Nerve with Unusual Complications.

Mr. Mules reported this case: The patient was a man aged 75 who, feeling ill on May 4, 1900, proceeded to treat himself on the following original plan: He first took half a box of "wind pills," together with a variety of other sorts. Feeling no better he took two ounces of a solution of tartar emetic. The vomiting having ceased two days later and feeling his head very sore, he applied to his forehead and scalp various applications chiefly used for veterinary purposes. He became so much worse that Mr. Mules was sent for. Incisions were then made into the œdematous scalp and ten grains of calomel were given. The following day (May 10th) the patient was better, though sloughs covered the scalp and there was severe pain. It was then noticed that there was paralysis of the third nerve. On May 27 the scalp had healed, but the paralysis remained.

The author thought that the cause of the trouble was herpes of the fifth nerve. This was the cause of the patient feeling ill in the first place. The vesicles were never seen on account of the applications which caused so much destruction of tissue. As a sequel to the herpes paralysis of the third nerve ensued.

Mr. Devereux Marshall referred to an exhaustive paper on herpes by Head and Campbell, published last year in *Brain*.

Dr. Alden Turner saw no reason why the third nerve

should not be affected and did not consider motor paralysis uncommon after an attack of this disease.

Mr. Marcus Gunn asked if there had been an injury, and mentioned a case in which an attack had definitely followed such.

Mr. Johnson Taylor asked if any vesicles had been seen on the cornea, and in reply Mr. Mules stated that none had been observed.

Double Symmetrical Opacities of the Cornea.

Mr. Mules recounted this case: The patient, who was aged 70, developed opacities of the cornea eight years ago. These were symmetrical and brownish in color and had been increasing. The apices were at the pupils and their bases at the corneal margin. A vertical slit was present in each. One was removed by scraping, but the other was removed far more easily by means of a fine knife inserted beneath it. The result was quite satisfactory.

The President said he had watched a similar case for seven years, but it had not reached the pupil and he had done nothing to it at present.

Erythropsia.

Dr. W. H. A. Rivers described a form of erythropsia which appeared, after exposure to high illumination, as a well-defined deep red border round a white object. The phenomenon might be regarded as an intermediate link connecting the ordinary forms of erythropsia with the transient red border seen round a white object which had been described by Shelford Bidwell. It was shown that Bidwell's phenomenon, "border erythropsia," the artificial erythropsia of Fuchs, and clinical erythropsia such as occurred after the removal of the lens, were probably closely related to one another. The causation of erythropsia in general was considered, and reasons were given for believing that all forms were due to the coloration by the light stimulating the retina by blood, and this might be produced in several ways: (1) by transmission through the sclerotic, etc.; (2) by internal reflection from the lateral walls of the eyeball; (3) by transmission through the anterior layers of the retina. The experiments of Birkhoff showed that erythropsia might occur when light was pre-

vented from passing through the peripheral part of the eyeball, but these experiments did not exclude the third of the sources above mentioned.

Remarks were made by Dr. Edridge-Green and Mr. Swanzy.

Dr. Rivers briefly replied.

Eye Injury Due to Lightning in South Africa.

Major M. T. Yarr contributed two cases. He stated that while encamped in the Orange River Colony in March, 1900, they were exposed to a violent thunderstorm. (1) Major H. had his tent pole struck; at the same time he felt tingling down the right side of his head and right arm. He became partly unconscious, but soon recovered from this, but the tingling persisted for some days. Four months later he discovered accidentally that he was practically blind in the right eye, and was invalided to the base hospital. When seen by the author in August, 1900, he could only count fingers at three feet. There were several large hæmorrhages, evidently not of recent date, and patches of atrophy in the retina in the region between the superior and inferior temporal veins, with a few scattered and much smaller hæmorrhages in the periphery, some engorgement of the veins, pallor of the disc, and contraction of the arteries. The left eye was normal. (2) Richard C., aged 25, a private in the Second Royal Berkshire Regiment, was employed on telephone duties at Belfast, Transvaal. On October 18th, 1900, he was sitting at his "operating table" during a storm, when his instrument was struck by lightning. He fell, and on regaining consciousness he was unable to see. He had suffered no bodily injury, but his instrument was bent. The next day he could distinguish between light and dark; about a week later he had perception of light in both eyes, could count fingers with the left, and the tension was normal. There was a large retinal detachment in the right eye, running in wavy whitish lines inferiorly. The left eye also showed a large detachment, but spread over a wider area. The vision had previously been quite good.

Card Specimens.

The following card specimens were shown: Dr. A. Bronner: Growth of the Conjunctiva from an Old Man. Dr. A.

A. Hudson: An Apparatus for Performing Massage on the Eyes by Means of a Vibrating Hammer. Major H. E. Drake-Brockman: A New Eye Speculum. Mr. J. H. Fisher: Subretinal Cystic Swelling in the Center of the Fundus. Mr. Inglis Taylor: Tubercle of the Iris. Mr. Richardson Cross: Congenital Fibro-Vascular Tumor Removed from the Eye. Mr. Stanford Morton: Double Coloboma of the Lens. Mr. Doyne: Hole in the Retina.

PRELIMINARY PROGRAM OF THE THIRTY-SEVENTH MEETING OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY.

Held on Wednesday and Thursday, the 17th and 18th of July, at the Pequot House, New London, Conn.

1. Report of Committee on Supplementary Reports of Cases which have been previously reported to the Society. Drs. Jackson, DeSchweinitz and Williams.

2. A Modification of Tscherning's Ophthalmophakometer. Dr. Howe.

3. An improved Lantern for Detecting Color-Blindness, to Supplement the Deficiencies of the Wool Tests. Dr. Wm. Thompson.

4. Report of Committee on Standards and Methods for Examination for Acuteness of Vision, Color-Sense and Hearing. Drs. Williams, Wm. Thompson and Dennett.

5. Contribution to the Pathology of Vascular Growths into the Vitreous, with Demonstration of a Specimen. Dr. Marple.

6. Cyst of the Vitreous Body at the Head of the Optic Nerve. Dr. Koller.

7. On Adenoma of the Meibomian Glands, with Colored Illustrations of the Clinical Picture and Microscopic Demonstrations of the Original Tumor and its Development Into Adeno-Sarcoma and Adeno-Carcinoma. Dr. H. Knapp.

8. Adenoma of the Lacrymal-Caruncle, with the Report of an Additional Case. Dr. Veasey.

9. A Case of Melanotic Giant-Cell Sarcoma of the Lim-

bus, Associated with an Implanted Secondary Growth in the Lower Lid. Drs. O. F. Wadsworth and Verhoeff.

10. Double Panophthalmitis of Septic Origin. Dr. Jackson.

11. A Study of Six Cases of Metastatic Choroiditis Occurring in the Course of Pneumonia Due to "Grippe." Dr. Bull.

12. A Case of Primary Tuberculosis of the Iris (with Microscopic Specimen). Dr. Hepburn.

13. Histological Description of an Eyeball with Unusual if not Unique Lesions in the Inner Nuclear Layer of the Retina which Clinically Simulated Glaucoma. Dr. DeSchweinitz, with collaboration of Dr. E. Shumway.

14. The Post-Operative History of Fifty Cases of Simple Chronic Glaucoma. Dr. Bull.

15. Concerning the Treatment of the Apparently Unaffected Eye in Monocular Glaucoma. Dr. DeSchweinitz.

16. Extraction of a Large Foreign Body from the Anterior Chamber with Complete Preservation of Vision. Photograph of the Foreign Body in Situ. Dr. St. John.

16½. Case of Foreign Body in the Eye Eighteen Years. Three Attacks of Uveal Inflammation Without Loss of Vision. Dr. A. A. Hubbell.

17. Results of X-ray Diagnosis and of Operation in Injuries from Foreign Bodies. Dr. Sweet.

18. A Case of Cystic Growth (not Traumatic) in the Orbit, Complicated With Exostosis of the Frontal Sinus. Dr. Andrews.

19. Thrombosis of the Cavernous Sinus. Dr. Jackson.

20. Report of a Case of Injury of the Orbit, with Paralysis of the Oblique Muscles; Complete Restoration of Function of the Muscles Following Operation on the Orbit. Dr. Andrews.

21. A New Instrument for Determining the Position of the Axes of the Eyes. Dr. Williams.

22. Dislocation of the Lacrymal Gland. Dr. Mittendorf.

23. Report of Two Cases of Removal of Lens in Excessive Myopia. Dr. Minor.

24. Rapid Changes in Refraction Occurring in the Eyes of Diabetic Parents (with Case). Dr. Carpenter.

25. A Case of Hunterian Chancre of the Caruncle Followed by Secondary Symptoms. Dr. Hepburn.

26. An Unusual Case of Chronic Inflammatory Hypertrophy of the Lid Margin. Dr. Cheney.

27. Anophthalmos Congenitus (Two Cases). Dr. Claiborne.

28. A Note Concerning the Ocular Conditions in Anchylostomiasis Duodenalis. Dr. Hansell.

29. Corneal Loupe With Oblique Illumination. Dr. Koller.

30. The Electric Light. A Study of the Best Means for Softening the Light with a Minimum Loss of Illumination. Dr. Andrews.

31. A New Incandescent Electric Lamp for Ophthalmoscopic Examinations, and for Use in the Lantern for Testing Color-Sense. Dr. Williams.

32. On the Frequency of Asthenopia, Especially in America. Dr. Howe.

33. Two New Instruments. Dr. Theobald.

PAMPHLETS RECEIVED.

"Post-Febrile Insanity and Its Treatment," by F. P. Norbury, M.D.

"The Relation of the Sympathetic Nervous System to Functional Amblyopia," by H. S. Pearse, M.D.

"Report of a Different Operative Method in the Treatment of Trachoma, with Notes Upon the Construction of an Instrument Devised for the Purpose," by P. Ch. Jameson, M.D.

"A New Clinometer for Measuring Torsional Deviations of the Eye, Delineating Paracentral Scotoma and Metamorphopsia and Detecting Simulation of Blindness," by A. Duane, M.D.

"Report of the Committee of the American Ophthalmological Society on Standards and Methods of Examining the Acuteness of Vision, Color-Sense and Hearing, for Railway and Marine Service."

ABSTRACTS FROM MEDICAL LITERATURE.

By W. A. SHOEMAKER, M.D.
ST. LOUIS, MO.

THREE CASES OF CATARACT FROM LIGHTNING STROKE.

Josef Preindlsberger (*Wiener Klinische Wochenschrift*, March 28) reports three cases. In two, cataract developed in both eyes two days after the accident. One was a boy, 13; the other 11 years of age. Both were rendered unconscious; the elder for a short time only; the younger for two days. In both cases linear extraction was performed with success. The third case was a man, aged 24, who had been struck by lightning six years before. He was unconscious for ten minutes. A cataract developed in the right eye some months later. The author performed extraction with iridectomy with success.

PTERYGIUM OPERATION—METHOD BY SUBCONJUNCTIVAL ANTERO-INFERIOR FIXATION.

John O. McReynolds (*Ophthalmic Record*, May) finds the method of transplantation much more satisfactory than any method of simple abscission. After a thorough trial of the various methods of transplantation he has adopted the following:

1. "Grasp completely the neck of the pterygium with a strong, narrow fixation forceps. 2. Pass a Graefe knife through the constriction and as close to the globe as possible, and then with the cutting edge turned toward the cornea shave off every particle of the growth from the cornea. 3. While the pterygium is still held, divide the conjunctiva and sub-conjunctival tissue along its lower margin with a pair of slender straight scissors, commencing at its neck and extending toward the canthus, a distance of one-fourth to one-half of an inch. 4. Still holding the pterygium with the forceps, separate the body of the growth from the sclera with any small non-cutting instrument. 5. Now separate well from the sclera the conjunctiva lying below the oblique incision made with the scissors. 6. Take black silk thread armed at each end with small curved needles and carry both of these needles through the apex of the pterygium from without inwards, separated from each other by a sufficient amount of growth to secure a firm hold. 7. Then carry these needles downward beneath the loosened conjunctiva lying below the oblique incision made by the scissors. The needles, after passing in

parallel directions beneath the loosened lower segment of the conjunctiva until they reach the region of the lower fornix, should then emerge from beneath the conjunctiva at a distance of about one-eighth to one-fourth of an inch from each other. 8. With the forceps lift up the loosened lower segment of conjunctiva and gently exert traction upon the free ends of the threads, and the pterygium will glide beneath the loosened lower segment of the conjunctiva; the threads may then be tied, and the surplus portions cut off, leaving enough to facilitate removal after proper union. It is important that no incision should be made along the upper border of the pterygium, because it would gap and leave a denuded space when downward traction is made upon the pterygium. The elasticity of the conjunctiva is such that when this downward traction is exerted on the head of the pterygium it becomes thinned and smoothly applied to the sclera, corresponding to the former site of the body of the growth, and the margin of the conjunctiva coincides accurately with the sclero-corneal junction. Thus, when the operation is completed and the speculum removed, the stitches are hidden by the lower lid and the only denuded area is on the cornea. The former site of the body of the pterygium is covered by thin and comparatively non-vascular conjunctiva. What blood-vessels remain are directed downward and hence do not tend to encroach again upon the cornea, while the vascular activity is concentrated beneath the lower lid, where it is not only removed from view, but protected, and atrophy surely and naturally follows. The corneal wounds heal quickly and the thin conjunctival tissue becomes closely adherent to the sclera. After a few days the single stitch can be removed and the old pterygium be found firmly adherent to the sclera and hidden beneath the loosened lower segment of the conjunctiva. If the head of the pterygium is very large it may be cut off before the growth is drawn down. The general direction of the traction thread is vertical, but it is usually best to incline them in such way that they will emerge from that part of the conjunctiva that lies below the cornea. This is often necessary so as to permit the denuded sclera to be completely covered by smooth conjunctiva, and if the conjunctiva should slightly overlap the cornea at any point it can easily be trimmed away without interfering with the desired result."